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SCIENCE NEWS LETTER

ASTRONOMY

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



A SCIENCE SERVICE PUBLICATION

PHARMACY

Drug Shortage Worry Ends

Wounded in Korea treated with methadone, a synthetic made from cheap, common chemicals called nitriles. Pain of hundreds at Hungnam beachhead "floated away."

► OUR WOUNDED MEN in Korea have been getting a new pain-relieving drug so good that the "pain just floated away on a cloud," as one of them said.

This pain-killing drug was given to hundreds of wounded Marines during the fighting just before evacuation from Hungnam beachhead and while recovering from operations in the Army General Hospital in Tokyo.

Results were so good that Army and civilian medical authorities are now convinced that we need never again fear any shortage of pain-killing drugs such as morphine.

Morphine comes from opium from poppies. China, now Red, is one big source. But the new pain-killer is a synthetic drug made from cheap, common chemicals called nitriles. Its name is methadone. Grain for grain, it is the exact equivalent of morphine in relieving pain. There is plenty of it now and it can be made in any needed amounts.

"There is no longer any necessity for stockpiling morphine," Dr. Henry K. Beecher, professor of anesthesia at Harvard and chief of the anesthesia department at

Massachusetts General Hospital, declared.

"I don't make statements like that lightly," he added.

Dr. Beecher, civilian consultant to the Surgeon General of the Army, has just returned from Korea where he saw the results of methadone in relieving steady, bad wound pain. They confirm a three-year careful trial of the drug on civilian patients at Massachusetts General Hospital.

Methadone was developed in Germany during World War II at the I. G. Farbenindustrie. Our Army, heretofore always concerned over a possible shortage of morphine, pushed trials of it in cooperation with the National Research Council and the National Institutes of Health. The methadone used in Korea is a new form, called iso-levo. It causes less nausea than the racemic form which is now on the market. It has addiction properties and its sale is therefore controlled under the federal narcotics law. But besides its pain-relieving quality, methadone can be used as a substitute for morphine to withdraw that drug from morphine addicts.

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MEDICINE

Nerve Gases a Threat

Civil defense authorities warn that air raid shelters should be designed to filter out germs, nerve and other poison gases and radioactive particles.

► NERVE gases and disease germs attacking humans, food animals and food crops now are officially joined to atom bombs as dangers against which civilians must prepare to defend themselves.

All air raid shelters should be designed with provision for adequate filters to keep out germs, nerve and other poison gases and radioactive particles, local civil defense authorities are advised by the Federal Civil Defense Administration.

On the germ warfare picture, technically termed biological warfare or B. W. for short, CDA authorities are somewhat reassuring. Man has been warring against germs for thousands of years, they point out. With vaccines, antibiotics and other drugs and sanitation, man lately has been on the winning side in this war. Strengthening and reinforcement of existing health and agricultural agencies is what we need to protect us from germ war with germs

used against us by human enemies.

The nerve gas picture seems less reassuring. These are more poisonous than any previously known war gases. They are nearly odorless and colorless. They are fast acting. Death comes in a few seconds if they are inhaled in sufficiently high concentration. A few drops of the liquid form on the skin, if sufficiently concentrated, is equally fast-killing.

The nerve gases block the action of a vital enzyme called cholinesterase. This enzyme destroys acetylcholine, a chemical produced by nerve stimulation. If acetylcholine is not destroyed at a proper rate, it overstimulates nerve endings which control breathing and circulation of the blood.

When large amounts of these nerve gas chemicals get into the body, severe bronchospasm results. The victim cannot take a breath or expel one. Involuntary contraction of muscle fibers, reaching the point

of epilepsy-like fits, is another result of nerve gas poisoning.

Antidote to the nerve gases is atropine, familiar to hundreds of thousands who have had it dropped in their eyes before examination for eye-glasses. But atropine is itself a deadly poison. It should be used only by a physician. Solutions of atropine loaded in disposable one-shot ampins or syrettes for use by physicians or health service workers might be included in local civil defense supplies, federal CDA authorities suggest.

Nerve gas warfare monitoring devices for civil defense are not presently available at prices that would make their purchase and use practical. Gas masks suitable for the civilian population are being worked on but are not yet available. More elaborate masks and protective clothing for rescue workers are presumably available but "wide-scale purchase" is not advised at present.

Since the nerve gases are heavy and stay close to the ground, persons in upper stories of buildings might escape an attack unharmed.

Artificial respiration will be needed to save some nerve gas victims. But first aiders doing this work will probably have to learn a new, more efficient method than the standard prone pressure method that now saves drowning, electrocution and carbon monoxide gas victims.

One reassuring feature of the nerve gas picture: While very dangerous to people, they are not destructive of property and facilities as atom bombs are. This might limit their use by an enemy.

Details on these "special weapons" is given in CDA's latest guide book for local civil defense authorities, Health Services and Special Weapons, 60 cents at the Government Printing Office. A booklet on biological warfare for the general public is promised soon.

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CHEMISTRY

Patent New Method To Produce Enzymes

► A NEW method for artificial production of enzymes, complex organic substances which speed up chemical processes such as fermentation and human digestion, is a top patent just issued.

The enzymes are produced by bacteria grown in tanks or vats on solutions of starches, proteins and bits of broken grain. This system, long sought with little success, is more efficient than producing enzymes on the surface of liquids or on solid nutrients such as yeast.

The inventors of the new process are Carl V. Smythe of Moorestown, N. J., and Billy B. Drake and Clifford E. Neubeck of Philadelphia. Their patent (2,530,210) has been assigned to the Rohm and Haas Co. of Philadelphia, a leading chemical firm.

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PLANT PATHOLOGY

Bread Basket Endangered

Nature's biological warfare has struck viciously at the nation's wheat crop in the form of wheat stem rust which ruined fourth of crop in North Dakota and Minnesota.

► NATURE'S biological warfare has struck viciously at the nation's bread basket and the American wheat crop is endangered. This was learned from Dr. Elvin C. Stakman, world authority on plant diseases known for his wheat breeding research at the University of Minnesota, who retired as president of the American Association for the Advancement of Science, meeting in Cleveland.

A severe epidemic of wheat stem rust menaces the whole wheat crop of this year. This fungus can cause a wheat field to have an almost complete crop failure. Known as race 15 B stem rust, this disease exploded in North Dakota and northwest Minnesota in Durham wheat never before affected. It ruined 25% of the crop there the past year. Then it invaded vast fields farther south, getting into Texas and probably invading Mexico. In these southern climates it can winter successfully and the winds of next year will be able to spread it aerially to the great wheat areas northward where it will race through the green fields like devastating biological fire.

The extreme seriousness of the new wheat rust invasion lies in the fact that it affects all kinds of bread and macaroni wheats, used for our cake, cracker and all other breadstuffs.

Through years of laborious wheat breeding and selection, Dr. Stakman and other

agricultural scientists had been able to give American agriculture wheats that were wonderfully resistant to the kinds of rust diseases that have been most prevalent in the past.

They knew that potentially dangerous kinds of fungus diseases lurked undercover, likely to flame disastrously at any time. One of these previously unimportant rusts is the present saboteur, whose full scientific name is *Puccinia Graminis-tritici* physiological race 15 B. Recognized first in 1918, it has never before become widespread. The late spring of 1950 gave it its chance to invade wheats that had never rusted before.

Plant disease fighters of the U. S. Department of Agriculture and the state agricultural experiment stations are alerted to the danger and the fight is underway, although money so far available for defense is inadequate. At present Uncle Sam spends little more than \$50,000 on this phase of protection of our bread supply. Undoubtedly Congress will be asked for emergency funds at once.

Foreseeing the danger of just such an epidemic, the scientists have been breeding new kinds of wheats to meet such an emergency. It may take years to get a variety resistant to the new 15 B rust, even with the head start that past research gives them.

Dr. Stakman explained that there are about 13,500 kinds of wheat in the world,

each of which should be tested under various conditions of light and temperature to see how they grow when attacked by about 250 parasitic diseases. The task is gigantic. Yet it must be tackled if America is to continue to feed itself and help keep the world from hunger. It takes 12 years to breed a new wheat.

Nature is continually plotting such disease warfare against our crops and only continual scientific defense will save us from food shortages in the future.

The last great wheat rust epidemic was in 1935 when the fungus known as number 56 became dangerous, but it was not as serious as the present epidemic.

Oats, too, has been attacked in 1950 seriously by a stem rust closely related to the new wheat rust. Known as race number 7, this disease menaces a crop that is important in animal feeding.

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PHARMACY

Third Anti-Arthritis Drug, Compound F, Synthesized

► A THIRD hormone drug to fight the pain and disability of arthritis has been successfully synthesized by four Merck chemists. It is Kendall's Compound F, a substance that was first isolated in 1930 from the adrenal cortical gland.

The synthesis of this Compound F is expected to add to the volume of the drugs that can be used to treat a variety of disorders which now respond to cortisone and ACTH, which have produced dramatic effects in treatment of rheumatoid arthritis, rheumatic fever, bronchial asthma, allergic disorders, inflammatory eye diseases and skin disorders.

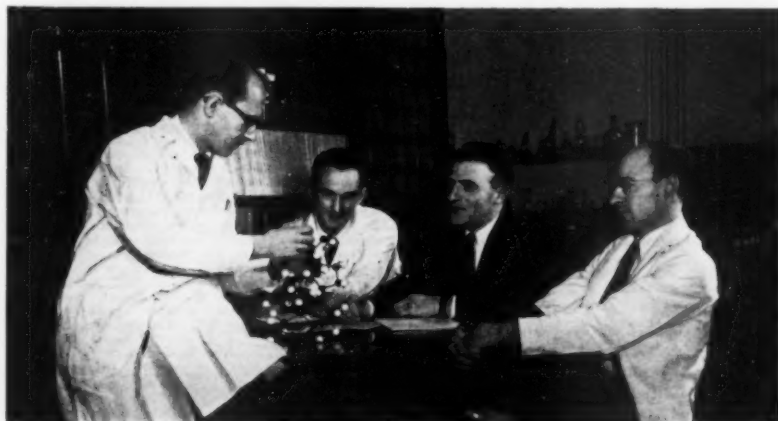
Dr. Max Tishler, developmental research director of Merck and Company, reported the new synthesis to the American Association for the Advancement of Science on behalf of a team consisting of Drs. Norman L. Wendler, Robert P. Graber, Robert E. Jones and himself.

The importance of Compound F lies in the hope that it will have fewer harmful side effects than cortisone when used on human patients. If it proves to be better, it might replace cortisone. Compound F chemically is 17-hydroxycorticosterone and it is the only known substance comparable to cortisone and ACTH.

Compound F has had preliminary medical trials which hold out the hope that it will team with the other steroid compounds in disease treatment. Its synthesis starts with desoxycholic acid, a substance obtained from animal bile and the procedure requires two more chemical steps than the cortisone synthesis.

Once the medical world is convinced that Compound F will be useful in the treatment of human disease substantial supplies of it can be made available in a few months.

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NEW DRUG—Synthesis of Kendall's Compound F was achieved by these four Merck & Co. chemists. From left to right, Drs. Robert P. Graber, Robert E. Jones, Max Tishler, and Norman L. Wendler. Dr. Graber is holding a model of the Compound F molecule.

VETERINARY MEDICINE

Good for Man and Beast

Just about the same techniques of medicine are used in treating sick horse or dog as help to cure human ills. Anesthesia now important for sick animals.

► IF YOU were a sick horse or an ailing dog, you'd probably be treated with essentially the same techniques that medical doctors use on human patients.

Dr. O. H. Siegmund, of the school of veterinary science, University of California College of Agriculture, compares the practice of medicine on human beings and other animals.

The use of anesthesia, which enables doctors to perform otherwise impossible surgery on humans, plays an important part in saving the lives of many valuable farm animals and pets.

Giving anesthesia for treatments causing pain is now routine in animal cases. General anesthesia is given by injection into veins or by gas inhalation.

Spinal anesthetics and drugs producing nerve blocks are used in many cases. The drugs, introduced in the immediate vicinity of the nerve affected, destroy sensation in localized areas—an aid of great value to animal surgery.

Cows frequently swallow dangerous objects such as nails, which may penetrate the walls of one of their stomachs and cause death. With the nerve block, these deadly objects may be removed while the animals remain standing unrestrained and insensible to pain. Injured tissues are repaired or necessary operations performed without further injury to the animals and in most cases full recovery is the result.

Like small children, animals are not always cooperative when distasteful medicines are prescribed. Whenever possible, drugs

are mixed with feed (the castor oil in orange juice treatment) so that the animals swallow them without knowing it.

But when the disagreeable taste of a drug cannot be disguised it is fed through a stomach tube. This method is painless and it guarantees ingestion of the drug into the animal's system.

Similar to human cases, when it is necessary for drugs to begin action immediately, some medicines are given by intravenous injection. This method is particularly valuable in emergencies when large quantities of drugs must be administered. Blood transfusions—often necessary to save life—are made by this means.

Penicillin is usually injected deep in the muscles, just as in human patients. Here it is slowly absorbed over long periods, eliminating the need for frequent injections.

Large amounts of liquid are sometimes given by injection to sick animals that have become dehydrated by refusal to drink during illness. And recent advancement in animal treatment has been the use of soluble sulfa drugs in solutions which can be injected even into the interior of the abdominal cavity.

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"Persian lamb" pelts and the so-called Karakul skins come from Afghanistan, Iran and Southwest Africa.

Wild rabbits are heavy breeders but only about 20% of the young born each spring and summer live to reach the late fall hunting season.

● RADIO

Saturday, January 13, 1951, 3:15 p.m., EST

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Paul C. Mangelsdorf, geneticist of Harvard University, will discuss "Hybrid Corn Helps Feed the World."

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GENERAL SCIENCE

Scientists Face Dilemma

Three major speeches at meeting of AAAS present problem of scientists called upon to devote most of their energy to military research and to work in secrecy.

► THREE major speeches given at the Christmas meeting of the American Association for the Advancement of Science in Cleveland, Ohio, posed the dilemma of modern science in a world torn by international strife.

One, by the retiring president of the Association, Dr. E. C. Stakman, was a defense of science against the notion that it has produced such terrible weapons that it is time to have a moratorium on science until man learns to control those weapons.

Dr. Stakman presented his defense of science in terms of the "humanistic" contributions science makes to civilization. He pointed to increasingly efficient uses of land and water to feed the ever-growing population of the world. He declared that the scientific search for truth sets an ethical example for other groups in the world.

However, Dr. Eric A. Walker, executive secretary of the Defense Department's Research and Development Board, pointed out that military research is already taking up two-thirds of all the money being spent on research in this country and that this total will be greatly expanded in 1951 and 1952. Shortly, almost half of the total national supply of persons qualified to do research and development, said Dr. Walker, will be engaged in military research.

Dr. Walker made his bow to the "humanistic" aspects of science, pointing to the

byproducts of military research. He mentioned the medical aspects of atomic energy, and research in biological and chemical warfare which has produced byproducts of benefit to agriculture and medicine.

But even as some scientists are defending science as being of benefit to mankind, other scientists are being forced by the world situation to retire with their research behind the iron curtain of military secrecy and to work on the technological development of new weapons.

One of the consequences of this course of events was pointed up by Dean Louis N. Ridenour of the Graduate College, University of Illinois, in an address on Science and International Understanding.

Secrecy, he said, does not necessarily mean that there will be no development of scientific thought and technological products. Referring to Nazi Germany and Communist Russia, he pointed out that even dictatorship need not necessarily slow down scientific development.

It is quite possible, he said, that with science developing in two different worlds sealed off from each other, it might go, in each of those worlds, in two different directions. Thus, he said, our scientists may have little idea of the direction which Soviet science is taking or the distance it has travelled in that direction.

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ASTRONOMY

Mirror Betters Telescopes

► THE COLOR performance of even the largest refracting or lens-type telescopes may be improved because of a change which Dr. James G. Baker, Harvard Observatory's optical expert, described to members of the American Astronomical Society meeting at Haverford, Pa.

Astronomers working with such famous instruments as the Yerkes Observatory's 40-inch refractor (largest of its kind), the 26-inch instrument at the Naval Observatory, and Princeton's 23-inch, have all been troubled with rings or haloes of unfocused color around the image. This new arrangement would completely eliminate this undesirable feature of present-day refractors.

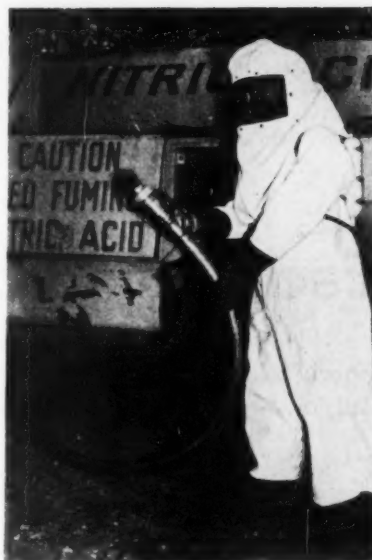
Dr. Baker suggested that a special-type lens-mirror be added to the system. This would be a negative achromatic lens with its rear surface aluminized or silvered to return light to a focus. A small field lens

near the original focal plane is recommended.

In reality this compound lens-mirror, which is the reverse of the achromatic or convex-concave lens used with some refractors, could be quite small. It need be no more than one-fifth the diameter of the main lens. Thus an eight-inch lens could do the job for the 40-inch refractor at Yerkes.

With this refractor-corrector, light over the whole visible spectrum would be brought to the same focal point, Dr. Baker calculates. The loss of light with this arrangement is only about 15%. This loss is very small when compared with the loss of light for refractors in their present form caused by the fact that light of different wavelengths is not brought sharply to a single focal point.

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PROTECTION—This odd outfit is designed to make safe the handling of liquid rocket propellants. An outer garment of white mercerized cotton that resembles terry cloth fits over a coverall and hood of vinyl-impregnated fiberglass. The outer garment can be saturated with water to prevent overheating. An airbreathing apparatus is attached.

AERONAUTICS

Rocket Fuel Handlers Protected by Clothing

► HAZARDS to handlers feeding nitric acid and other dangerous fuels to rockets is greatly decreased with the use of new protective clothing developed at the Wright-Patterson Air Force Base. Rocket power is widely used in guided missiles and in airplanes to assist in take-off.

Special clothing for these workers is important because a number of the liquid propellants used in rockets are dangerous to handle, sometimes being deadly to persons who absorb them through the skin or inhale their fumes.

One such propellant, widely used because of its effectiveness, contains red fuming nitric acid and aniline. Fuming nitric acid is less stable and more active chemically than ordinary concentrated nitric acid, and it gives off fumes when exposed to the air. Aniline is highly toxic and readily absorbed by the skin. If enough gets into the blood, it causes death.

The clothing developed covers the entire body and head, with a transparent plastic visor over the face. Butyl rubber boots and vinyl-coated cotton gloves are worn with

it. The clothing itself is made of vinyl-impregnated glass fiber.

Wearers of the clothing would suffer from heat if no cooling system was available. Two have been perfected. In one air is forced into the interior of the suit and distributed through plastic tubing. The circulating air within the hood prevents

toxic fumes from getting inside, thus eliminating the need for a respirator.

In the other air-cooling system, a cotton outer shell of the clothing is saturated with water. Evaporation does the cooling. With this system the wearer must use air breathing apparatus. The air supply is carried on the back, suspended by straps.

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RESOURCES

Each Raindrop a Bikini

Proper use of water resources would bring benefits equal to those of peaceful application of atomic energy. But, on bare ground, each drop is a bomb.

► A BABY Bikini, this is the promise—and the threat—held out for every drop of water in our land by the seven members of the President's Water Resources Policy Commission in their report just made public.

Proper use of our water resources will bring us benefits at least equal to those from the peaceful application of atomic energy. On the other hand, improper use may bring about the decline and eventual fall of our civilization. Which of these two paths we follow will depend on our policy toward each potentially-explosive raindrop, the Commission concludes.

Soft as rain may sound, each drop can be a tiny bomb, smashing into bare ground. A violent rainstorm may splash into the air more than 100 tons of soil per acre. Best protection against splash erosion is shielding the soil with growing crops or with mulches. These are two of the many actions recommended to save our water from being rushed to the sea.

The Commission believes that water control is best attacked along nature's divisions, on a river-basin, multi-purpose basis. Each watershed has similar problems of flood control, recreation facilities, power supply, land management, stream pollution, irrigation, etc.

Major policy changes in planning, in evaluating and in financing are required to give us full benefits from our water.

The Commission assumes that ours is an expanding economy, that our growing population will reach 190 million in about 25 years. Merely to keep our present standard of living in the coming years will require careful control of water to irrigate fields and for power purposes. Wise conservation of this key resource, however, is needed for any expansion and economic progress, on which rests the main hope of achieving world peace.

Two possibilities are mentioned as now unexploited sources of water: the sea and the clouds. A boost in the money going into research on rainmaking is strongly urged. At the same time a national policy to control forcing rain from the clouds is needed.

Although admitting that the rainmakers had not yet proved many of their claims, the Commission nevertheless implied that the method showed sufficient promise to justify "substantial funds" for further research.

The possibilities of making rain were first announced after the war by Drs. Vincent J. Schaefer and Irving Langmuir of General Electric Co. They succeeded, first in the laboratory and then in clouds, in seeding air masses containing water vapor to make them produce more precipitation than would naturally occur. Dry ice was later replaced by silver iodide as the seeding material.

Another possible water-supply source that needs further research is sea water, the Commissioners conclude. Although it can now be converted into fresh water for ships at sea and for military occupation of islands with insufficient water supply, the methods are all very expensive. Some inexpensive way is needed to make sea water fit for use. The energy that pours down on us from the sun is suggested as a possible source to be harnessed for this job. Using the difference in temperature between water at great depths in the sea and that near the surface may also be a fruitful method to give us usable sea water, they suggest.

Seriously concerned over the water supply problem, vital to peacetime expansion as well as to wartime preparations, President Truman last January appointed the seven-member Commission to make recommendations concerning the proper use and conservation of our water.

The members are Chairman Morris L. Cooke, vice-chairman Gilbert F. White, Paul S. Burgess, Lewis Webster Jones, Samuel B. Morris, Leland Olds and Roland R. Renne.

This report will be followed by a second volume containing details of the study made of ten river basins and a third volume summarizing the laws applying to water resources. Changes that are required in the present laws to back up the recommendations as well as new legislation will also be submitted later.

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EDUCATION

Colleges on Accelerated Basis by Next Fall

► UP TO 85% of the 800 to 900 substantial, degree-granting colleges and universities in the country will be on a three-year speed-up basis by next September. This move will affect more than 1,500,000 students.

Defense Department officials and the U. S. Office of Education already are making plans to educate college presidents to the need of this step in the interests of national defense. Officials of most technical and engineering schools don't need this education. At least one top engineering college has already definitely decided, although not publicly, to institute acceleration next June.

The Defense Department will shortly announce formation of a committee on educational planning, headed by Navy Capt. J. J. O'Donnell, whose regular job is chief of Information and Education for the department. Its function will be to plan the tasks of the nation's colleges in training for defense. The first job it will tackle will be that of selling the idea of the need for acceleration.

U. S. Commissioner of Education Earl J. McGrath is considering calling a conference of outstanding college presidents to discuss the need for acceleration.

It is the thinking in the Office of Education that it will take the month of January to bring home to those colleges not yet planning acceleration that the manpower programs of the Armed Forces will require such a step. About Feb. 1, therefore, planning for acceleration will become general.

Most state universities are on a sort of accelerated program right now. A student, by attending summer school, can receive his degree in three years instead of four. It is some of the private colleges and universities, especially the liberal arts institutions, who will be slowest in installing an acceleration program.

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MEDICINE

Alcoholic Is Made By What He Eats

► IT IS what you eat, not primarily what you drink, that determines whether you become an alcoholic. Prof. Roger J. Williams, University of Texas biochemist, in receiving this year's Southwest award of the American Chemical Society, declared that is probably the case for humans, although his detailed experiments were upon rats.

The differences between drunkard rats, moderate drinking rats and teetotaler rats have a genetic basis but also a nutritional basis. Rats, he found, can be made to drink or be abstainers, depending upon their diet.

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RESOURCES

Urge Registry of Engineers

► THE Engineers Joint Council, representing 160,000 of the nation's engineers, is asking the government to register every engineer up to age 70 in critical fields and to draft them where necessary for work in industry and civil defense as well as in the Armed Forces.

In a letter to Manpower Director Robert L. Clark of the National Security Resources Board, the council said the shortage of engineers is now so acute that this step must be taken even if total general mobilization is not immediately necessary.

The Council also supported Selective Service Director Lewis B. Hershey's plan for postponement of service for qualified high school graduates to go to college. Even during all-out mobilization, Council members said, there should be at least a trickle of boys moving through college.

The proposal, as outlined by E. G. Bailey, vice-president of Babcock and Wilcox and chairman of the Council's Engineer Manpower Commission, would call for the registration of up to 400,000 engineers and persons in school working toward an engineering degree. Selective Service would do the job.

The government was urged to set up a National Engineering Personnel Board which would review the registration and establish criteria for placing registrants in an engineering reserve. The board would

have the power to compel registrants to take jobs in defense industries, or with civil defense, or to draft them into the Armed Forces.

The Council's statement was backed up by letters and telegrams from 16 industrial corporations. The General Electric Company reported that the engineer shortage was "acute and desperate" and that it was impossible to fill the current needs plus losses to Selective Service and of reservists being called up. Pratt and Whitney pointed out that it now takes three times as many engineers to draft plans for airplanes as it did ten years ago.

The Engineers' plan is the most drastic yet suggested to the government. Chemists and physicists have proposed to the NSRB much the same plan but only for use in full mobilization.

The critical shortage of engineers was not foreseen, either by the engineers themselves or by the Department of Labor. Much publicity was given last spring to the view, since found to be erroneous, that June, 1950, graduates in engineering would have a hard time finding jobs. Industry, as a matter of fact, absorbed the entire 1950 class of 50,000.

Based on current college entrance rates and men in classes now, the graduating classes will drop to a low of 12,400 by 1954, which will mean a shortage of 40,000 engineers to fill peacetime requirements for in-

dustry alone.

The Korean war changed all that. Now the situation is so acute that one corporation has told a medium-sized engineering college that it will take its entire 1951 class sight unseen, at rates of pay 25% higher than the going rate.

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AERONAUTICS

"Flying Spray Tank" Tested for Crop Control

► A STUBBY little airplane which is not much more than a flying insecticide tank is being flight-tested at College Station, Texas.

Designed specifically for dusting, spraying, seeding or fertilizing farm crops, the new single-seat plane is the joint project of the Civil Aeronautics Administration, U. S. Department of Agriculture, Texas Engineering Experiment Station, Texas Agricultural Experiment Station and the National Flying Farmers Association.

Its gleaming metal fuselage and deep, blunt wings are built to hold hoppers and tanks for crop-control dusts and chemical sprays. With a payload nearly equal to the weight of the plane itself, it can take off from short, soft fields and fly relatively slowly with its wheels a few feet above the fields to be treated.

At the end of a run, it can zoom quickly to miss obstacles at the edge of fields, turn sharply and return with little wasted time for another pass.

These are characteristics which dusting and spraying pilots requested in a nationwide CAA survey preceding development of the new plane. A CAA contract for the plane was awarded in December, 1949. In less than a year the first prototype was in the air.

Two airplane manufacturers as well as the CAA, Department of Agriculture and University of Texas assigned personnel to work on the project. Many parts, including engine, propellers, landing gear and seat were contributed by their manufacturers.

The contributors included the Continental Motors Corp., Cessna Aircraft Corp., Aeronca Aircraft Corp., Cornell University Medical College (pilot protection), U. S. Rubber Co., Goodyear Tire and Rubber Co., McCauley Propeller Co., Koppers Co., Beech Aircraft Corp., Safe Flight Instrument Co., Vic Pastushin Industries, Inc., American Seating Co., (crash seat), and Aircraft Conversion Co.

Despite a gusty 30 to 40 mph wind, the first test flight of the new plane was a success. With a top speed of 115 mph, the crop duster can operate as slowly as 60 mph, landing without payload at 37 mph. It has a 400-mile range and if necessary can go as high as 12,000 feet. Full-span slotted flaps and ailerons give it high maneuverability at low speeds.

Science News Letter, January 6, 1951



INSECTICIDE TANK—This little airplane is designed especially for dusting, spraying, seeding or fertilizing farm crops. Fred E. Weick is shown opening one of the spray tanks.

ARCHAEOLOGY

Antiquity Is Restored To Folsom Man

► THE MYSTERIOUS ancient American, Folsom man, is an old-timer after all. He lived about 10,000 years ago. Anthropologists, who have found his distinctive stone spear points in diggings over a wide western U. S. area, had a bad scare when the first "atomic calendar" tests of charcoal of his campfires showed a mere 4,000 years of age.

Dr. Willard F. Libby of the University of Chicago's Institute of Nuclear Science made a recount on other material known to have been associated with Folsom man, whose skeletons have never been found. He extracted the radiocarbon from the charred meat within a burned bone from a long extinct species of bison that Dr. E. H. Sellards found associated at Lubbock, Tex., with things that Folsom man once used. The intensity of the exploding carbon atoms gave an age of 9,900 years, with an indefiniteness of 350 years more or less.

The radioactive age tests can be made because cosmic rays from outer space smash nitrogen of the upper air into a radioactive kind of carbon which disintegrates with a half disappearing in 5,600 years. Weakness of radiation measures the antiquity of living matter that uses the carbon.

Science News Letter, January 6, 1951

MEDICINE

Some Modern Medicine Due to Primitive Indians

► MODERN medicine owes a surprisingly large debt to aboriginal peoples, for both medicals and psychological attitudes.

This was asserted by Clarence E. Smith, University of California anthropologist, who reported on South American Indian pharmacopoeias to the American Anthropological Association meeting at Berkeley, Calif. Despite the irrational ideas about the causes of disease, the rational use of medicines by primitive peoples is more extensive than is generally realized, Mr. Smith said.

The medicine man used a brightly colored, foul-smelling, or evil-tasting preparation with the idea that it would be unpleasant enough to drive the devils causing the disease out of the sick body.

The patient was prepared for magical effects, so that maximum psychosomatic benefits might result. Moreover, the medicine often was made from purgative or emetic substances which are commonly used today for the same beneficial effects, Mr. Smith said.

Thus the primitive medicine served "to eliminate toxic substances in practice as well as in theory, thus fulfilling physiological functions corresponding to desired magical results."

The Indians had a wide variety of other

medicines which they used correctly: diuretics and sudorifics; tonics, balms, counter-irritants, anesthetics, astringents, stimulants and anti-dysenterics. They had medicines for correct use in catarrhal diseases, malaria, pinworms and tapeworms.

Proper use was made of anti-spasmodics in snakebite and substances to restrict or increase menstrual flow.

Mr. Smith pointed out that as early as the 15th century there began a flow to Europe of the medical lore of the native South American peoples, marking an era of medical as well as geographical discovery.

Science News Letter, January 6, 1951

PSYCHIATRY

Nystagmus May Be Caused By Emotional Crisis

► ADD to the list of disorders, such as ulcers and colitis, which psychologic or emotional upsets may bring on: the eye condition called nystagmus.

This condition of involuntary shifting or swinging of the eyes from side to side was brought on in a nine-year-old boy as the aftermath of the "nervous crisis" caused when he was forced to change from left to righthandedness.

Previously known causes of nystagmus are congenital defects and diseases of the eye, ear disturbances and disease changes of later life which cause poor vision.

The boy who got his from changing handedness is now a young man of 22. He is not conscious of any disturbance in vision but still has his nystagmus. The eye movements can be seen by others and get worse after any emotional upset. The case is reported by Dr. Mary P. Lord of the Imperial College of Science and Technology, NATURE (Dec. 16).

Science News Letter, January 6, 1951

ENTOMOLOGY

Spray Guns Used in Fight Against Sheep Ticks

► HIGH POWER spray guns are replacing traditional dipping vats in the fight against sheep ticks that interfere with America's wool production.

Hand spray guns operating at 400 pounds per square inch pressure quickly saturate the fleece with several insecticides, including DDT, toxaphene, chlordane and lindane, all effective.

Developed by Dr. Lee Seghetti and B. D. Firehammer of the Montana Veterinary Research Laboratory, the progress is reported to the American Veterinary Medical Association.

Sheep ticks are properly not ticks at all, but wingless flies, which move about under the fleece, biting and sucking blood, causing the animals to damage their coats by scratching.

Science News Letter, January 6, 1951

IN SCIENCE

GENERAL SCIENCE

New \$1,000 Award Given for First Time

► A NEW national award in science, a thousand dollar prize for scientific achievement founded by Dr. William Procter, Bar Harbor, Maine, biologist, was awarded for the first time by the Scientific Research Society of America at its Cleveland meeting.

The first recipient of this new award is Dr. Karl T. Compton, chairman of the Massachusetts Institute of Technology, who is being honored for his scientific research, administrative and national service.

The new prize will be given annually by the Scientific Research Society of America which in industrial research corresponds to Sigma Xi in university circles.

Science News Letter, January 6, 1951

CHEMISTRY

New Leak Stopper Hardens Away from Air

► UNLIKE paint which hardens when exposed to air, a new material announced by General Electric scientists hardens when away from air. It is a material to stop invisible leaks, to lock a nut on a bolt and to bond materials together.

The new material, for which there are many industrial applications, is a type of "solventless" varnish which G.E. scientists have developed and call "permafils." Ordinary varnish hardens by evaporation. The permafils harden by chemical action. This new one remains a liquid as long as air is passing through it.

When two metal strips are coated lightly with it and clamped together, the joint will support ten pounds after ten minutes or 100 pounds after 20 hours. More rapid hardening will take place if heat is applied. The material can be used to bond other substances besides metals, including even paper and fabric which can be bonded to themselves or to other materials.

An application suggested is to hold a nut on a bolt without the use of a lock nut. For this purpose, it is put on the threads of the bolt. Similarly, it can be used to make leak-proof pipe joints by application to the threads of the joints.

Dr. Robert E. Burnett and Birger W. Nordlander, both of the G.E. research laboratory staff, are responsible for the new substance. They coined for it a high-sounding name, "anaerobic permafils." In simple language this means non-air-living permanent filling.

Science News Letter, January 6, 1951

SCIENCE FIELDS

MEDICINE

Aureomycin No Help As Cure for Colds

► PATIENTS taking aureomycin in the hope of curing a common cold are wasting their money, it appears from a report in the *NEW ENGLAND JOURNAL OF MEDICINE* (Nov.).

The golden-yellow wonder drug, one of the so-called mold remedies, is good medicine for many serious diseases. But in a carefully controlled study of patients with the common cold, there was no significant differences between results obtained with aureomycin and results obtained with a make-believe medicine.

The study was carried out under the direction of Col. Robert J. Hoagland, M.C., chief of medical service of the Army Hospital at the U. S. Military Academy, West Point, N. Y.

Science News Letter, January 6, 1951

AERONAUTICS

Bakelite Is Good Shoeing For Airplane Skis

► THE PLASTIC known as bakelite is a good material to use as shoeing on skis for airplanes to permit take-off and landing on snow, the Canadian National Research Council reports.

Experience has shown that laminated bakelite shoeing will out-last sheet metal and rarely needs to be replaced during the life of the ski. The low thermal conductivity and smooth surface of bakelite give it low sliding resistance and low adhesion to snow.

This research organization is making extensive studies of skis for airplanes, the subject being important in Canada because of conditions encountered by planes in many areas during much of the year. The objective is to find the best type of ski design and construction to give reduced sliding resistance and adhesion.

Sliding resistance of aircraft skis on snow is often so great that it is impossible to reach flying speed. At other times, when the skis remain stationary on snow for even a few seconds, they adhere to the surface and difficulty may be experienced in breaking them free.

Several types of skis have been tested. Early in the work it was found that sliding resistance and adhesion are more dependent upon snow conditions than on the design of the ski. Moreover, the skiing quality of snow varies continually and it is not unusual to observe marked changes taking place in less than an hour.

As a result of the studies already made, certain theories have been developed. New types of skis are promised. One type of NRC skis tested during the past winter appears to be somewhat better than the conventional skis.

Science News Letter, January 6, 1951

MEDICINE

ACTH Prevents Blindness In Korea's Wounded

► ACTH, famous arthritis remedy, may save many wounded in Korea from blindness. The drug's ability to retard growth of fibrous tissue, particularly in scarring wounds, leads Army medical authorities to expect it to have blindness-preventing action.

In wounds close to a nerve, the fast growth of fibrous tissue in the scar may interfere with the nerve's function. In case of wounds to the eye, only a small scar may produce blindness.

Science News Letter, January 6, 1951

MINERALOGY

Plan To Develop Better Beryl Recovery

► A RATHER common form of quartz known as pegmatite is to be mined in the Black Hills of South Dakota to obtain beryl, an essential minor mineral important in the Defense Program.

Beryl is chemically beryllium aluminum silicate, and from it the metal beryllium is obtained. This metal is used in X-ray tube windows and in many applications in the atomic energy field as a moderator and reflector of neutrons.

Beryl itself has many industrial uses. It is employed directly in the production of high-grade dielectrics for use in airplane sparkplugs. Beryllium-copper alloy goes into current-carrying springs, switches, welding tips, matrix metal in diamond-drill bits, non-magnetite ball-bearings and non-sparking tools.

The new program is an undertaking of the U. S. Bureau of Mines to develop better and more practical methods for the recovery of beryl from granite. Ore-dressing or metallurgical tests will be made in the Bureau's laboratory in Rapid City, S. D. Important in the program is the recovery of all minerals within the pegmatite. Pegmatite may contain feldspar, mica, columbium, tantalum and lithium.

The Black Hills is already the nation's principal source of beryl, but the recovery of beryl has been incidental to the recovery of the other minerals in the pegmatite. Although the area has already produced some 1,800 tons of beryl, the recovery process is not efficient. Better methods are hoped for as a result of the research to be undertaken.

Science News Letter, January 6, 1951

MEDICINE

New Medical Test For Expectant Mothers

► A SIMPLE test is now available which promises help for physicians in treating complications of early pregnancy, including miscarriage.

The new aid is an application of the smear test which has been applied successfully in diagnosing cancer of the cervix, lung, and stomach.

In this test, cells taken from body fluids are stained and then observed under a microscope. Cancer cells have a distinct appearance to a trained observer. Two University of California School of Medicine physicians, Dr. Herbert F. Traut and Dr. Ralph C. Benson, have found the test also can be a guide in abnormal pregnancy states.

In a study of 201 patients, they found that the test can diagnose pregnancy in a large percentage of cases, determine a trend toward miscarriage, indicate complete miscarriage, and establishes the termination of pregnancy. In each state, the cells from body fluids consistently have distinct appearances.

The physicians expressed the opinion that the use of the test in verifying different states of abnormal pregnancy will help to determine the best treatment. At the present time the methods for differentiating these states are not wholly satisfactory.

The work, financed by the U. S. Public Health Service, has been reported in part in the *JOURNAL OF CLINICAL ENDOCRINOLOGY* (July).

Science News Letter, January 6, 1951

PHYSICS

How A-Bomb Scientists Received Deferment

► HERE is how the Manhattan Project—which built the A-bomb during World War II—was able to secure deferment for scientists to work on the bomb, as Selective Service Director Lewis B. Hershey revealed it to Science Service.

"I had known Groves (Maj. Gen. Leslie R. Groves, in charge of the Manhattan Project) for a long time," said Gen. Hershey. "One day he came to me and said, 'Hershey, I've got a real Buck Rogers project on my hands and I need certain kinds of men to do the job. If you want, I'll tell you all about it.'"

"Well, I told Groves I didn't want to know anything about it, I'd take his word for it. If I knew, I might let it out sometimes because I make most of my speeches off the cuff and I'm inclined to say anything that comes into my head."

"So I passed the word on down the line, and when Groves wanted a man deferred to work on his project, all he had to do was ask."

Science News Letter, January 6, 1951

GENERAL SCIENCE

Outlook for 1951

Much of the world's talents will be devoted in the year to come to secret progress on new methods of destruction. But work on major problems will continue.

By WATSON DAVIS

► THE GREATEST menace to new discovery and development in science is the possibility of the extension of world war during 1951.

Much of the world's talent, brains and ingenuity, in America and other parts of the world, are already devoted to secret progress upon new methods of human destruction and the complex organization that backs up fighting forces. Continued spread of actual warfare and accelerated military preparations will necessarily limit fundamental and basic inquiries into the nature of things such as have led finally to such powerful weapons as the atomic bomb.

During the coming year probing of the

fundamental mystery of how the "heart" nucleus of the atom is put together will be continued. This line of research may lead to new kinds of atomic bombs and useful energy of materials more plentiful than uranium.

Despite this long-range usefulness to defense much of this work may be announced to the scientific world because it does not seem to be immediately applicable to weapon development. From the standpoint of purely military objectives, support of research in theoretical physics, now at the highest level in history, is justified.

The complete secret of the composition of matter can hardly be developed in the coming year. Similarly, the duplication of photosynthesis, the process by which the green plants use sunshine, can hardly be accomplished in the coming year. Fundamental work upon photosynthesis is relatively neglected and yet a way of applying artificially in a factory this mechanism, which only the green leaves now understand might be extremely important in keeping the peace of the world. It might bring great amounts of energy to areas of the world which are fighting primarily because they are hungry, insecure and envious of the nations that have ample energy from coal, oil and gas.

Foundations for Peace

If wider spread actual fighting can be avoided, there may be some hope in 1951 for building psychological and social foundations for future peace. Billions of dollars have been spent to understand the atom, but fundamental inquiries into the human mind and emotions have been backed with only a few hundreds of thousands of dollars. This would be the work of psychologists, psychiatrists, anthropologists and those who have made a study and practice of government.

In a sense, the whole attempt at keeping the world at peace through the United Nations and in other ways is a cut and try experiment. Scientifically, the difficulty is the impossibility of trying the experiments over. We cannot know what might have happened if something else had been done. Attempting to build a practical science of human behavior, in the broadest possible sense, is long overdue. The imminence or the actuality of war makes it even more urgent.

Creation of an artificial moon for the

earth is a possibility for the future, but one that will hardly be realized in the coming year. Man could, given enough resources, rocket into outer space an object which would travel around the earth in a orbit. This could be used for scientific observations and even eventually for military purposes. For that reason some government may be at work on this project in great secrecy.

These are long term projects and it is perhaps too much to hope that results will come from them during 1951. Here are predictions that can be made with more assurance:

The National Science Foundation will organize itself and begin work, making its first awards during 1951 and developing a national fellowship plan to speed fundamental scientific research.

Whether the persecution of scientists primarily because they have new and often liberal ideas will increase or abate during 1951 is a question.

International Meeting

From the standpoint of international scientific cooperation, scientists and laymen alike will watch with great interest what happens to the International Astronomical Union meeting scheduled for Leningrad in Soviet Russia in early August of 1951. One of the ironies in the situation is this: If Soviet Russia decides not to admit the astronomers of western nations to its territory, an alternative invitation from U. S. astronomers can hardly be utilized because under the McCarran act Soviet astronomers and many in Iron Curtain and other areas in the world cannot be admitted to the United States.

Regardless of what happens to their meetings politically, astronomers all over the world will continue to study the peaceful heavens. From South Africa the Armagh-Dunsink-Harvard new type reflecting telescope, an instrument resulting from the unusual cooperation of Eire, Northern Ireland and the United States, will give its first results on an investigation of the "hub of the universe." Two giant coronagraphs to keep track of the activity of the sun will be completed for Harvard Observatory's stations on western mountains. The world's largest, 200-inch telescope on Palomar will bring forth new information about the structure of the universe.

Application of radiocarbon dating methods to the earth's recent past will continue to give shocks to anthropologists who will have to adjust radically their ideas of the antiquity of man. As a result, new theories will have to be developed, an activity which because of disturbed world conditions in many cases will substitute for the actual

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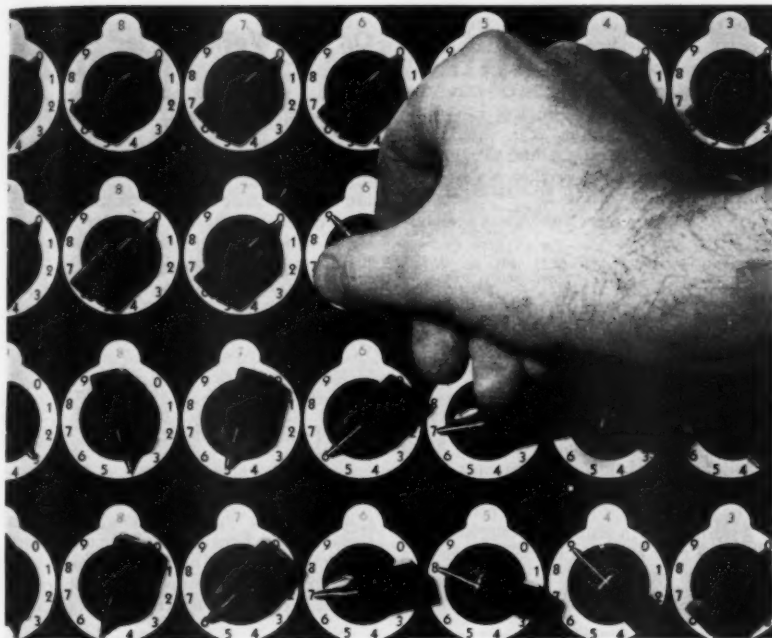
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TO SOLVE PROBLEMS—Complex electronic computers, the "mechanical brains" of science, will have problems dialed into them in 1951 which would take battalions of competent mathematicians years to solve.

digging in the field which archaeologists would like to do.

The remarkably successful use of the antibiotic drugs in fighting infectious disease and the use of cortisone and ACTH hormones in treating a large number of disorders will continue to dominate new medical developments during 1951. Some of the new antibiotics isolated and tested during the past few years may get to trials on human patients.

The life of human blood in blood banks may be extended beyond the present 21-day period of useful life, through a new low temperature preservation method of red blood cells.

In agriculture's continuous fight against animal disease there is likely to be an eradication campaign against the serious

disease, hog cholera, through the destruction of diseased animals.

Many of the complex and expensive elec-

CHECKING UP

Science Service's forecast for 1950 issued a year ago said that new chemical elements would be discovered. This prediction was fulfilled by the discovery of elements 97 and 98.

Another outstanding 1950 development forecast was the use of radioactive carbon in dating archaeological and geological remains, which was one of the outstanding achievements of the year.

The discovery of new kinds of mesons, the powerful but brief-lived particles in the hearts of atoms, was predicted. This was fulfilled by work in both the United States and England which revealed two new kinds of such particles.

As foreseen, there was continued success in the use of the steroid compounds, cortisone and ACTH, in treating disease.

There were also new chemicals for insect control and weed killing developed as also expected.

Two major problems, which the forecast of a year ago considered very long shots for 1950 are still unsolved: photosynthesis and the nature of the physical forces within the atom.

So far as known, man did not succeed in creating an artificial satellite of the earth, although research leading to it would undoubtedly have been kept secret.

Large computing machines did come into more extensive use, but many of those under construction during the year will not really get to work until 1951.

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tronic computing machines will be completed in 1951. But there will not be a sufficient number of mathematicians available to set up problems and feed them to these electronic brains.

Rocket progress and jet developments will be accelerated, but secrecy may withhold reports.

Congress will need to consider the mathematical problem of reapportioning members of the House of Representatives more

equitably among the states in accordance with the results of the 1950 census, but this will be considered more as a political than as a mathematical matter.

This spring may bring some hope that the man with the lawn mower can avoid his Sunday chore. The year should tell whether chemicals that stunt the growth of grass can be used to produce a neat lawn without clipping.

Science News Letter, January 6, 1951

PSYCHIATRY

Pounding Stilled by Music

► THUMP-thump-thump, pounded the patient for hours and hours, lying on the floor of his room at the Topeka State Hospital.

He was a very sick mental patient, so aggressive that two aides resigned because they were afraid of him.

Then music was piped into his room. At first it was primitive music, with a rhythm that matched his pounding. Then the rhythm was gradually changed to something softer and less exciting. The patient changed his rhythm, soon stopped pounding and was able to discuss music with the music therapist. Later, other personnel of the hospital could approach him. Now

he is well enough to have freedom of the grounds.

His case is cited as one example of how music is being used along with other kinds of treatment to help mental patients at the hospital in Topeka, Kans.

The music is piped into treatment rooms and wards over an abandoned telephone system. The type of music is varied according to whether something relaxing or something stimulating seems needed. Records play constantly in a remodeled basement tunnel. The ward doctor can call the telephone operator and ask for one of four kinds of music or no music.

The same system serves as the hospital's fire alarm. In case of fire, the operator could cut out all the music and make announcements over the loudspeakers.

Science News Letter, January 6, 1951

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MEDICINE

Sterilization Urged For Breast Cancer

► STERILIZATION of young women with breast cancer was advocated by two doctors reporting at the meeting of the Radiological Society of North America in Chicago. The doctors are Dr. Rieva Rosh and George G. Green of Bellevue Hospital, New York.

Sterilization, they reported, suppresses female hormone action. In the X-ray method they use, it has a favorable general effect on the body and helps to heal and to check the formation of cancers that have spread to the bones.

Pointing to the high death rate from cancer of the breast each year, 12 per 100,000, the New York doctors said that "every effort to increase the salvage of these patients, whether by operation, irradiation, hormone or combination therapy is worth the greatest consideration."

Sex hormone treatment made about half the patients feel better, but improvement that the doctors could see occurred in only about one-fourth of the 40 patients. X-ray treatment combined with male hormone treatment has given the maximum relief in most cases.

Deep X-ray treatment to the pituitary gland in the head was advocated for cancer

On This Week's Cover

► THE photograph on the cover of this week's SCIENCE NEWS LETTER was not taken in Alaska, but in Chile's Valley of the Moon, where it is now midsummer. The heap is not snow but the famous Chilean nitrate, raw material of fertilizer and explosives. Bulldozers and tractor scoops, like snow removal equipment in this country, handle it in wholesale lots.

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of the prostate gland in a report by two other scientists, Drs. Walter T. Murphy and Harry Schwippert of Buffalo, N. Y. Object of this is to decrease male hormone production.

In a series of 30 cases of cancer of the prostate treated by X-rays to the pituitary gland together with castration and the synthetic female hormone, stilbestrol, in most cases, a significant number obtained relief from pain and a temporary let-up of the disease beyond that which could be expected from either castration or stilbestrol alone.

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ENGINEERING

Oak Ridge Scientists Read by Facsimile

► BORROWING from the library with the speed of electricity will soon be commonplace at the Oak Ridge National Laboratories.

A high-speed, long-distance facsimile system has been installed to allow scientists at widely-separated laboratories to consult library references without leaving their buildings.

Developed by RCA Laboratories, Princeton, N. J., the system uses a tiny spot of light focused on the page to "read" the copy. This light is converted into electrical signals that are then transmitted over an ordinary telephone line. The recorder reproduces a clear, legible copy at the rate of 128 square inches per minute.

Science News Letter, January 6, 1951

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ASTRONOMY

Million New Galaxies

Two major instruments were used in an 18-year hunt for universes beyond our own Milky Way System. Almost a billion are believed to exist within billion light years.

► AN 18-YEAR hunt for galaxies, those clusters of myriads of faint stars and a few nebulae, was reported by Dr. Harlow Shapley, director of Harvard College Observatory.

This search has led to catching, on Harvard photographs, a million new galaxies such as our own Milky Way System, he told members of the American Astronomical Society.

The two major instruments for "galaxy hunting" have been the Bruce telescope in South Africa (now replaced by the Irish-American reflector) and the similar Metcalf doublet at Oak Ridge, Mass. Earlier plates made in Cambridge, Mass., and in Peru helped in cataloguing the thousand brightest star-systems.

Within 20 degrees of the Milky Way, little can be learned about how these galaxies beyond our Milky Way Galaxy are distributed. The light-diminishing dust and gas of our own Galaxy through which we must look blots out these nebulous-like objects.

Along the borders of the Milky Way, a few windows in the obscuring smog are found through which the distant galaxies can be seen faintly, or sometimes even clearly, Dr. Shapley said in delivering the Henry Norris Russell lecture.

In more than half of the sky, however, the way is clear for a comprehensive survey. There is no known limit to its depth in space.

In this dust-free half of the sky, where most of the work was done, the Harvard galactic bureau on the average had to consider stellar objects of all magnitudes down to faint 15.2 in order to find even one galaxy in five times the space covered by a full moon.

These star-systems come in pairs, groups,

clusters and larger aggregations, much as people in the United States are unevenly distributed, Dr. Shapley reported.

Almost a billion galaxies are believed to exist within a billion light years (a light year is the distance light, traveling at 186,000 miles a second, goes in a year) from us, awaiting discovery with our greatest telescopes. And another billion galaxies lie hidden by the star-clouds of our Milky Way, if their distribution is at all uniform, the astronomers were told.

Dwarf galaxies, because of their faintness, are imperfectly represented in the census of all such star systems up to magnitude 17.5, visible only with powerful telescopes. But giant systems like our Milky Way, even when four or five times as distant, are picked up in the survey.

Studies of the inner metagalaxy, and especially of our Milky Way System, have strengthened the Harvard astronomer's belief that galaxies begin as chaotic, irregular systems. Developing through the various grades of spirals, with their stellar aggregations and newly formed supergiant stars, they finally become the smoothly-arranged spheroidal galaxies.

The Universe is still in its youth, Dr. Shapley said. Billions of years must pass for a spiral galaxy to develop, and yet many such spirals or young galaxies still exist.

Giant stars are still being born, he pointed out. A study of the two nearest external galaxies, the Clouds of Magellan, have shown that the Large Cloud is still rich in the stuff from which new low-density stars are made. Hundreds of these presumably young supergiant stars are found there, some of them 10,000 times as bright as our sun and 2,000 times the sun in diameter.

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ENTOMOLOGY

Stoneflies Live and Grow In Freezing Temperatures

► THIS is a winter story, although it has to do with life and love among the insects in the freezing spring of Alaska.

Discovery of stoneflies that "conduct themselves normally and enjoy full use of their body functions" at a temperature of 32 degrees Fahrenheit, the freezing temperature of water, is reported (SCIENCE, Dec. 22) by Dr. R. I. Sailer, of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

Digging into a frozen stream on an Alaskan mountain side a couple of years

ago Dr. Sailer found a number of stoneflies in an ice enclosed cavern that had been eroded above a riffle in the stream. He observed some of these insects that escaped and concluded that they are remarkable because they continued to grow and live at temperatures which stop the development of most insects.

The "thermophobic insect", as Dr. Sailer calls it, is able to reproduce under frigid conditions of temperature.

Although experience with other poikilothermic animals (which means cold-blooded animals) shows that they usually require more than one season to complete their development, the stonefly seems to have one generation each year.

Dr. Sailer suggests that these strange creatures would give useful information if others studied them more thoroughly.

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EDUCATION

\$20,000,000 Wanted To Fight Illiteracy

► AN EXTENSIVE program of fighting illiteracy in all parts of the world during the next 12 years at a cost of \$20,000,000 is being planned by UNESCO in Paris. Funds for the drive would come from private and governmental sources outside UNESCO's regular budget.

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AGRICULTURE

Picking by Machine Cheaper Than Hand Labor

► TO USE mechanized cotton pickers or handpickers with their long sacks? That is the \$64 question that many cotton growers ask themselves at harvest season—proving that the machine has not yet won out.

Mechanized cotton pickers do not have to be paid wages, but there is the steep initial investment, depreciation, taxes, insurance, interest if purchased on time, gasoline and oil.

Trimble R. Hedges of the agricultural economics division of the University of California at Davis and Warren R. Bailey of the U. S. Department of Agriculture recently made a study of cotton picking in relation to the cotton acreage of California's San Joaquin Valley.

These were their conclusions:

In spite of the hidden costs of the mechanical cotton picker it is still cheaper than hand picking—especially if the seasonal crop exceeds 200 bales.

Basing their study on the 1949 experience of 63 California cotton growers, Mr. Hedges and Mr. Bailey found an advantage of almost \$19 per bale in favor of the machine.

But to maintain this advantage, they pointed out, the grower must (1) keep picking drums free of dirt, grease and soiled cotton; (2) moisten spindles as lightly as possible; (3) pick during most favorable weather conditions; (4) plant his crop with mechanical harvesting in mind.

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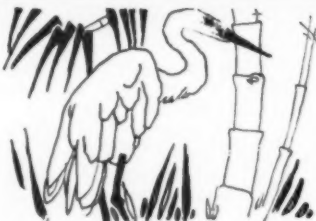
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ORNITHOLOGY

NATURE RAMBLINGS



Egret

► COVERING the southern tip of Florida is a watery, mangrove-choked wasteland which is the newest U. S. national park. To the Everglades, visitors from the frozen north will throng by the thousands this winter. They will come to see, not majestic mountains or towering waterfalls, but strange plants and beautiful birds.

The southern Everglades swarm with bird life, and naturally a great many of the birds are those which frequent water or the water's edge. In the Everglades there is a lot of water. Of all the tropical swimming or wading birds there none are more beautiful than the herons, and of the herons none is more lovely than the egret.

ZOOLOGY

Hormone Papers Honored

► FIVE PAPERS outlining discovery of a new hormone and description of the "growth machine" of the Cecropia caterpillar won for Dr. Carroll M. Williams of Harvard the American Association for the Advancement of Science \$1000 prize for the best paper presented at the annual Christmas meeting in Cleveland.

Dr. Williams, 34-year-old associate professor of zoology, and six associates described a metamorphosis hormone which presides over the synthesis of the cytochrome system in the giant caterpillar. The same enzyme system exists in humans and is the means whereby humans utilize oxygen.

"It seems possible," Dr. Williams said, "that abnormal growth, which we know as malignant disease, may result from the utilization of other enzymes which bypass the normal controlling mechanism coupled to the cytochrome system."

One of the papers told how the metamorphosis hormone affects the insect's latent knowledge of how to spin a cocoon. Study of this predictable pattern of behavior may result in further knowledge of the unpre-

This snowy bird is not so large as some of his cousins. It is a good-sized fowl, standing about two feet from beak to stern, but it is dwarfed in size by other herons or "cranes" which tower on spindly legs and soar on wide-stretched wings.

To ornithologists the true egret is "*Egretta candidissima*"—the whitest egret. He has a taller relative, with a few colored feathers. Both birds bear, during the nesting season, the delicate plumes once used in vast quantities to adorn milady's feathered hat.

Hunting these "aigrettes" threatened the very existence of birds which grew in quiet glory before man came. Even today, poaching is a considerable menace, although there are protective laws practically everywhere the egret might fly. These are well enforced, thanks to public sentiment and the National Audubon Society. Today there are egret colonies even in populated areas, near cities and tourist routes.

There is no reason why the North should not have its colonies of egrets as well as the South. The birds once nested as far north as Indiana. They retreated to their present restricted range, from North Carolina south and west to Louisiana, partly because too many two-legged inhabitants moved into their homelands, and partly because fashionable ladies demanded feathers of brilliant hues for their vanity. And there were men who catered to those demands, heedless of the near extinction of one of America's most lovely creatures.

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dictable behavior of other animals and humans, it was said.

Dr. Williams' associates in presentation of the five papers were: Dr. Richard C. Sanborn, Dr. Janet Passonneau, William Van der Kloot, Howard A. Schneidermann, Ned Feder and William H. Telfer.

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YOSEMITE FIELD SCHOOL

A Workshop in Interpretive Methods

Twenty selected college graduates will have the opportunity to spend the summer in Yosemite National Park under the tutelage of the National Park Service Naturalist Division. They will receive intensive, varied training in the presentation of natural and human history to the public, and in the techniques of interpretation on nature walks, with children, at campfires.

Also considered will be related matter such as museum methods and the use of museum and library materials. Twelve days will be spent in the High Sierra, an opportunity for maturing, exhilarating personal experience.

Students pay own expenses, plus modest incidental fee. Application deadline, February 28. For prospectus, address:

Director, Yosemite Field School
Box 545
Yosemite National Park, California

Books of the Week

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ATOMIC ENERGY AND THE HYDROGEN BOMB—Gerald Wendt—*Medill McBride*, 192 p., illus., \$2.75. Presents some of the principles of the hydrogen bomb and briefly discusses future possibilities of this anticipated discovery.

COSMIC RAYS—Louis LePrince-Ringuet—*Prentice-Hall*, 290 p., illus., \$6.65. Discusses what is known of the nature, origin and effects of cosmic rays. Translated from the French by Fay Ajzenberg.

THE DISPENSARY OF THE UNITED STATES OF AMERICA, Vols. I and II—Arthur Osol, Ed.-in-chief and George E. Farrar, Jr.—*Lippincott*, 1950 ed., 2057 p., \$25.00. Provides current data on many new and old drugs.

FIRE EFFECTS OF BOMBING ATTACKS—Civil Defense Liaison Office—*Gov't. Printing Office*, 45 p., illus., paper, 15 cents. A booklet telling of the effectiveness of incendiary bombs when used in warfare and the factors contributing to fire susceptibility of American cities.

HANDBOOK OF SOUTH AMERICAN INDIANS, Vol. 6: Physical Anthropology, Linguistics and Cultural Geography of South American Indians—Julian H. Steward, Ed.—*Gov't. Printing Office*, 715 p., illus., \$5.00. This final volume in an authoritative series is arranged topically and applies to all South America.

HISTAMINE ANTAGONISTS—Frederick Leonard and Charles P. Hutter—*National Research Council*, 122 p., paper, \$1.50. A study of compounds having the specific property of counteracting the physiological effects of histamine, such as the new preparations used against colds.

HUMAN BIOLOGY—George Alfred Baisell—*McGraw-Hill*, 2nd ed., 730 p., illus., \$6.00. A college text revised.

AN OUTLINE OF THE HISTORY OF CHEMISTRY—Herbert S. Klickstein—*Mallinckrodt Chemical Works*, illus., paper, free upon request to publisher, Department of Education, 2nd and Mallinckrodt Sts., St. Louis 7, Mo.

PHYSIOLOGICAL HYGIENE—Cleveland Pendleton Hickman—*Prentice-Hall*, 3rd ed., 557 p., illus., \$5.15. A college text brought up-to-date.

PLANT PATHOLOGY—John Charles Walker—*McGraw-Hill*, 699 p., illus., \$7.50. An introductory text.

PSYCHOSOMATICS AND SUGGESTION THERAPY IN DENTISTRY—Jacob Stolzenberg—*Philosophical Library*, 152 p., \$3.75. A handbook on how to better relationships between a dentist and his patients.

RADIO AND TELEVISION ALMANAC: Men, Events, Inventions and Dates That Made History in Electronics from the Dawn of Electricity to Radar and Television—Orrin E. Dunlap, Jr.—*Harper*, 211 p., illus., \$4.00.

SOCIAL ORGANIZATION OF THE WESTERN PUEBLOS—Fred Eggan—*University of Chicago Press*, 373 p., illus., \$6.00. A study of the social structures of the Hopi, Hano, Zuni, Acoma and Laguna Indians.

TECHNICAL OPTICS, Vol. II—L. C. Martin—*Pitman*, 344 p., illus., \$7.50. The second volume of the author's former work entitled "An Introduction to Applied Optics." This work includes some of the latest advances.

TREE GROWTH AND RAINFALL—A STUDY OF CORRELATION AND METHODS—Waldo S. Glock—*Smithsonian Institution*, 47 p., illus., paper, 30 cents.

VOICES OF FREEDOM 1901-1950—Robert McCormick, Narrator—*Educational Services*, \$5.95. A long-playing record depicting a half-century of American progress. Actual voices of great Americans such as William Jennings Bryan, William Howard Taft and Thomas Alva Edison are included.

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MEDICINE

New Drug Successful For Morphine Addicts

► SUCCESS with a new drug for treating morphine addicts was reported by Drs. Havelock Fraser and Harris Isbell of the U. S. National Institute of Mental Health at the meeting of the American Society of Pharmacology and Experimental Therapeutics in Boston.

The drug may also have great military and civilian value as a pain-reliever in first aid treatment. Drs. Fraser and Isbell pointed out. Its advantage in such cases is that it can be taken by mouth, instead of having to be given by hypodermic injection. It takes effect quickly and the effect lasts from 30 to 48 hours.

The drug is called acetylmethadol and is related to one of the new pain-relieving drugs, methadone.

It seems to be better than other drugs used to help morphine addicts taper off from morphine because its effect lasts longer and only one dose a day need be given, instead of three or four doses of morphine.

The new drug is addicting, like mor-

phine, so its use must be carefully regulated. Until further trials have been made, it should not be fully accepted for relief of pain, Drs. Fraser and Isbell warned.

A further advantage of acetylmethadol is that it is a synthetic chemical which could prove an excellent substitute for morphine and other opium derivatives for which the United States is dependent on imported supplies.

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Hardwoods are now becoming an important source of wood pulp for papermaking, thanks to new treatment processes.

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❁ **LUGGAGE CARRIER** of aluminum, attachable on the top of an automobile, is a flat 35-pound box that provides 15 cubic feet of weatherproof storage space. It rides on four vacuum cups and two rubber-cushioned cross braces.

Science News Letter, January 6, 1951

❁ **SCHOOL DESKS** that can not be chipped, worn or initialed, have an upper face of tough durable material surfaced with melamine resin. Marks from ink, pencils, modeling clay and other classroom supplies can be wiped off with a damp cloth.

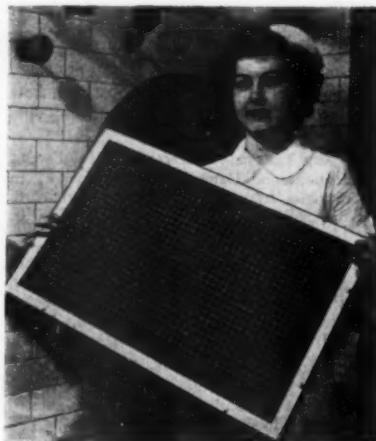
Science News Letter, January 6, 1951

❁ **NYLON DRIVESHAFT** in a new electric razor is used as a connecting rod to transmit power from the motor to the cutter blade. Weighing only one-eighth as much as metal, it still has the necessary strength, prevents the transmission of shock from blade to motor and absorbs vibration.

Science News Letter, January 6, 1951

❁ **POWERSAW SHARPENER**, for use in home shops to sharpen saws from six to ten inches in diameter, utilizes the regular saw table with a grinder substituted for the saw. A metal frame with an adjustable carrier jig that slides on the table holds the saw in any desired position.

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❁ **AIR FILTER** for use in hot-air-heating and air-conditioning systems, shown in the picture, is made of plastics that become charged with static electricity when exposed in a current of air. This electric charge attracts even the finest particles of foreign matter in the air.

Science News Letter, January 6, 1951

❁ **BATHROOM HEATER**, built into the wall, is hinged so that it can be pulled out and faced downward over the head of a person to dry the hair. A pull-out rack makes it usable as a clothes dryer and, by a flip of a switch, this electrical device becomes a cooler.

Science News Letter, January 6, 1951

❁ **GARAGE DOOR CONTROL** opens a roll-away door when a button in an approaching car is pushed and, at the same time, turns on the garage lights. A magnetic switch embedded in the driveway is activated by a magnetic field controlled by the pushbutton, the switch starting the motor that operates the door.

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❁ **INDUCTION APPARATUS**, for laboratory use in determining the carbon content of steel, assures rapid work without the discomfort of the heat from the now widely-used furnaces. It employs a quartz sample holder and an induction-type coil which heats the steel with radio-frequency electric energy.

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Do You Know?

Raw cabbage rates with citrus fruits in vitamin C content.

Nylon fabric may suffer damage in ironing if the iron is too hot.

Forests help purify the air, preserve the water supply and prevent soil erosion.

Pneumonia is not the menace it once was, thanks to sulfa drugs, penicillin and antibiotics.

A recent auction sale of government-owned fur-seal skins brought an 84% price increase in black skins over spring sales; black is fashion's present favorite.

Seed from California Redwood and Sequoia trees sent to England a century ago, and later, are responsible for the many trees of these types now in Great Britain.

A new factory in the Dominican Republic has recently been opened which will make some 7,000 gallons of 100% ethyl alcohol a day from local blackstrap molasses.

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